

Chemistry 11: Stoichiometry Lab

Purpose:

The purpose of this experiment is to apply your understanding of stoichiometry. In today's lab, a reaction between aqueous copper (II) sulfate and iron will be conducted to determine the amount of product produced and the percent yield.

Pre-Lab Questions:

- What type of reaction is this?
- Predict the products.
- Write a balanced chemical equation for this reaction (including states).
- If 1.5g of iron is added, how many grams of copper should be formed?
- If the reaction only produces 1.0g of copper, what is the percent yield?

Materials

- | | |
|-----------------------|----------------------------------|
| - Copper (II) sulfate | - 2 Scoopulas |
| - Iron filings | - Graduated cylinder |
| - 250 mL beaker (x2) | - Filter paper |
| - Hot plate | - Funnel |
| - Glass stir rod | - Acetone** Extremely |
| - Weigh paper | Flammable!!! Use caution! |
| - Scale | |

Procedure

Part A:

- Measure 35mL of water in a graduated cylinder and add it to a 250 mL beaker.
- Place the beaker on a hot plate and heat over medium temperature.
- Set the weigh paper on the scale and re-zero it.
- Weigh 5.5g of copper (II) sulfate and add it to the beaker of warm water
- Use a glass rod to stir the mixture until all the CuSO_4 is dissolved.
- Weigh 1.5g of iron and add it to the CuSO_4 solution.
- Stir the mixture a few times. You should see copper forming.
- Remove the beaker from heat and allow it to cool.
- Strain the mixture through a funnel and filter paper. Be careful not to lose any copper!
- Wash the copper with acetone. **CAREFUL! ACETONE IS EXTREMELY FLAMMABLE! Keep it away from a heat source or open flame.**
- Allow the copper to dry.
- Find the mass of copper you produced.

Part B:

- Repeat the procedure above, adding 1.0g of iron instead.

Observation and Results

Record any observations made throughout the experiment and how much copper your reaction produced.

Analysis

Show all work for the calculations below. You will have an answer for both Part A and Part B of the experiment.

1. How much copper (in grams) should have been produced from this reaction?
2. How many atoms of copper would this be?
3. How much copper was actually formed (in grams)?
4. Use a percent yield calculation to compare the two values from part 1 and 3.
5. What sources of error could account for this discrepancy?
6. What is the limiting reagent in this reaction?

Conclusion

In a concluding statement, record the amount of copper produced in the reaction along with the percent yield.

To Hand In: Your Lab Report ***MUST INCLUDE***

Class
Teacher
Date

Title

Your Name
Partner(s)

Purpose:

Pre-Lab:

Materials/Procedure: See Lab

Observations/Results:

Analysis:

Conclusion: